

A Watershed Conditions Report For the State of Kansas HUC 10270101 (Upper Kansas) Watershed



Kansas Department of Health & Environment
Bureau of Water
Watershed Management Section
1000 SW Jackson
Topeka, KS 66612



Watershed Conditions Report For HUC 8 10270101(Upper Kansas)

Prepared by
Kansas Department of Health and Environment (KDHE)
Nonpoint Source Section
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EXECUTIVE SUMMARY

This Watershed Conditions Report is designed to serve as a water quality “atlas”, and is intended to provide stakeholders in water quality with a tool to assess the quality of water resources within their watershed. Surface water quality for HUC 8 10270101 streams and rivers is generally in poor condition with the majority of the surface water bodies not meeting their designated uses. The primary pollutant concern within HUC 8 10270101 streams and rivers is fecal coliform bacteria (FCB). Potential sources of FCB contamination include feedlots, wastewater treatment facilities, septic systems, and wildlife. Additional pollutant concerns within the watershed include chloride, dissolved oxygen, and sulfate. The primary of source of chloride is intrusion from deep parent material underlying the surface waters. Potential sources of excess nutrients include registered feedlots, unregistered feedlots, wastewater treatment facilities, septic systems, wildlife, and grazingland. DO levels are often lowered by excess nutrients.

Within Huc 10270101 there are several small lakes. Currently, the Ogden City Lake is the only lake within this watershed that is monitored by KDHE. The primary pollutant concern for the Ogden City Lake is eutrophication. Eutrophication is a natural process which creates conditions favorable for algae blooms and excess plant growth. This process is often accelerated by excess nutrient loading from the watershed.

Groundwater resources in HUC 8 10270101 include Alluvial aquifers of the Kansas River and it's tributaries and portions of the Glacial Drift aquifer. Water from these aquifers is very hard with naturally occurring minerals and nitrate as the primary pollutant concerns.

PURPOSE

The Watershed Conditions Report is designed to serve as a water quality “atlas” for a given watershed, and is intended to provide Watershed Stakeholders Committees (WSC) with a tool to assess the quality of water resources within their watershed.

BACKGROUND

The Clean Water Act mandated that States assess the quality of their waters and implement Total Maximum Daily Loads (TMDLs) for water bodies that do not meet their designated uses. The following is a summary of steps taken by the State of Kansas to comply with these requirements of the Clean Water Act.

The Kansas Department of Health and Environment (KDHE) prepared the Kansas Unified Watershed Assessment in 1998. This assessment classifies the State’s watersheds into four categories. A Category I classification means the watershed is in need of restoration due to having water quality impairments or degradation of other natural resources related to an aquatic habitat, ecosystem health and other factors related to aquatic life resources. Category II are watersheds in need of protection. Category III are watersheds with pristine or sensitive aquatic system conditions on lands administered by federal, state, or tribal governments. Category IV watersheds are those for which there is insufficient data to make accurate classification. KDHE then assigned a restoration priority score to each Category I watershed.

As mandated by section 303(d) of the Clean Water Act, Lakes and streams within the Category I watersheds, which do not meet water quality standards, are published biannually in the 303(d) list. Subsequently, lakes and streams which appear on the 303 (d) list are scheduled to have a Total Maximum Daily Loads (TMDL) prepared. KDHE is currently preparing TMDLs for impaired stream segments located within the highest restoration priority watersheds.

To restore water quality within the Category I watersheds, KDHE recommends the implementation of a Watershed Restoration and Protection Strategy (WRAPS). The ultimate goal of the WRAPS process is to create and implement a plan to restore the health of water bodies that do not meet their water quality standards. Additionally, the WRAPS process will insure that water bodies that currently meet their water quality standards are protected.

KDHE recommends that the WRAPS process be implemented on a local level by a Watershed Stakeholders Committee (WSC). The WSC would have the responsibility of working with local and state agencies to develop a WRAPS plan. This plan should identify the following: public outreach methods; required monitoring activities based on water quality goals and outcomes; specific water quality problems; watershed coordinator/evaluator; actions to be taken to achieve water quality goals and outcomes; schedule for implementation of needed restoration measures; and funding needs.

Streams and Rivers

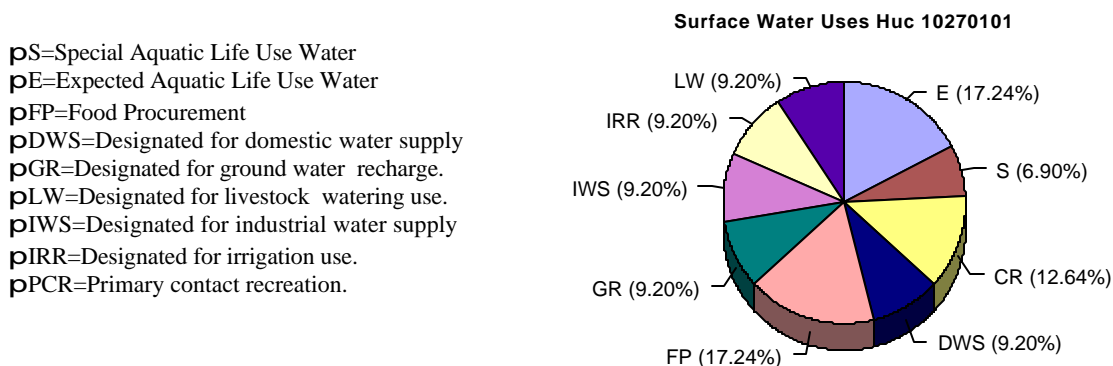
HUC 8 10270101

The Huc 8 10270101 watershed is ranked twenty-second in priority for watershed restoration throughout the state. According to the Unified Watershed Assessment, approximately 80% percent of the total miles of water in this watershed do not meet their designated uses. This watershed contains one large river and many small streams, tributaries and creeks. The Kansas River, Wildcat Creek, Clarks Creek, and Three mile Creek are among the larger rivers and creeks. See Attachment 1 for a map of streams and rivers in HUC 8 10270101.

Designated Uses

This watershed is mostly a drainage basin for the Kansas River, however several smaller streams and creeks are present. There are 41 public water supplies within the watershed, many of which draw water from the Kansas River. According to the Kansas Surface Water Register, the most common designated use for streams and rivers in this watershed include: expected aquatic life uses, food procurement, and contact recreation.

Figure 1



TMDL/Contaminate Concerns

Streams and rivers throughout Kansas have been sub-divided into segments. By dividing the streams and rivers into segments they can be better analyzed and understood. A reach of river or stream may have segments which vary greatly in water quality, based on surrounding land uses. The figures below display the impairments of the streams and rivers based on the number of segments sampled.

Surface waters not meeting their designated uses will require total maximum daily loads. As shown in Figure 2, 86% stream/river segments sampled are impaired and require TMDLs. The primary pollutant concern of this watershed's streams and rivers is fecal coliform bacteria (FCB). Fecal coliform bacteria is a bacteria present in human and animal waste. It serves as an indicator of potential disease causing organisms. Figure 3 shows that approximately 57% of these impaired stream/river segments are impaired by FCB, 14% by chloride (Cl), 14% by dissolved oxygen (Do), and 14% by sulfate (SO₄). Chloride is a naturally occurring mineral found in Kansas lakes, streams, and groundwater. In high concentrations, chloride can cause deterioration of domestic plumbing, water heaters, and municipal water works. Low

Low DO levels typically coincide with an abundance of algae, which may be caused by excess nutrients. An abundance of algae causes the population of decomposers to increase, which in turn uses up the oxygen in the stream or river.

Figure 2

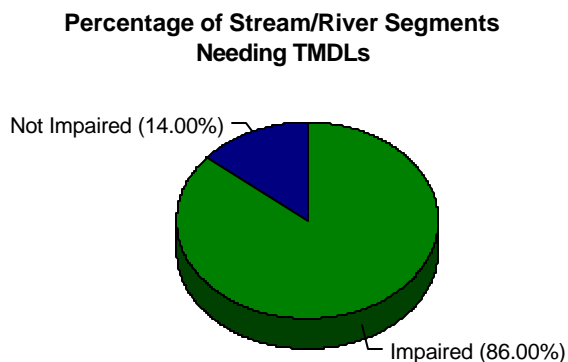
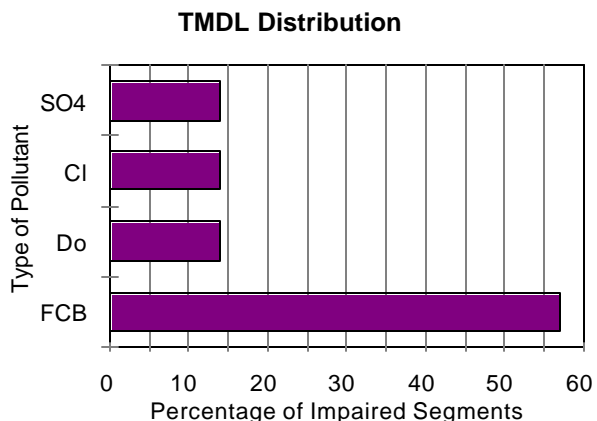


Figure 3



Potential Pollution Sources

Potential sources of FCB contamination include feedlots, wastewater treatment facilities, septic systems, and wildlife. The primary source of chloride is intrusion from deep parent material underlying the surface waters. Potential sources of excess nutrients include registered feedlots, unregistered feedlots, wastewater treatment facilities, septic systems, wildlife, and grazingland.

Analyzing the land uses within this watershed helps to understand which land uses might have greater influences on the source of the impairments. Below are a list of the land uses in this watershed which can effect a stream or river segment. Grassland is considered grazingland for livestock.

p Urban Area.... 2.6%	p Wooded area....8%
p Row Crop....12%	p Water area.... .3%
p Grassland....77%	p Other.... .1%

Feedlots: In the State of Kansas, confined animal feeding operations (CAFOs) with greater than 300 animal units must register with KDHE. There are approximately 40 registered CAFOs located within HUC8 10270101 (this number, which is based on best available information, may be dated and subject to change). Waste disposal practices and waste water effluent quality are closely monitored by KDHE for these registered CAFOs. Because of this monitoring, registered CAFOs are not considered a significant threat to water resources within the watershed. A portion of the State's livestock population exists on small unregistered farms. These small unregistered livestock operations may contribute a significant source of fecal coliform bacteria and nutrients, depending on the presence and condition of waste management systems and proximity to water resources.

Grazing land: Concentrations of livestock in and around creeks can be a significant source of FCB.

Wastewater Treatment Facilities: There are approximately 9 wastewater treatment facilities within the watershed (this number may be dated and subject to change). These facilities are currently regulated by KDHE under National Pollutant Discharge Elimination System (NPDES) permits. These permits specify the maximum amount of pollutants allowed to be discharged to the “waters of the State”. Due to the chlorination processes involved in municipal waste treatment, these facilities are not considered to be a significant source of fecal coliform bacteria; however they may be a significant source of nutrients.

Septic Systems: There are currently thousands of septic systems within the watershed and this number is increasing. When properly designed, installed, and maintained, septic systems can act as an effective means of wastewater treatment. However, poorly maintained or “failing” septic systems can leach pollutants into nearby surface waters and groundwater. The exact number of failing septic systems within the watershed is unknown; however the number may be increasing due to the current trends in suburban development. Local Environmental Protection Programs and County health departments may provide excellent sources of information regarding the proper design, installation, and maintenance for septic systems.

Wildlife: Wildlife located throughout the watershed are not usually considered a significant source of nonpoint source pollutants. However, during seasonal migrations, concentrations of waterfowl can add significant amounts of fecal coliform bacteria and nutrients into surface water resources.

Row Crop Agriculture: As stated above, approximately 12% of the watershed’s land is used for row crop agriculture. Row crop agriculture can be a significant source of nonpoint source pollution. Common pollutants from row crop agriculture include sediment, nutrients, pesticides, and fecal coliform bacteria. Many producers within the watershed regularly implement and maintain BMPs to limit the amount of nonpoint source pollutants leaving their farm. Some common BMPs include: the use of contour plowing; use of cover crops; maintaining buffer strips along field edges; and proper timing of fertilizer application.

Urban/Suburban Runoff: Many urban landscapes are covered by paved surfaces including roads, driveways, parking lots, and sidewalks. These surfaces are impermeable and tend to divert water into storm drains at high velocities. This increased flow velocity from urban areas can cause severe stream bank erosion in receiving water bodies. Additionally, urban and suburban runoff may carry other pollutants like petroleum hydrocarbons and heavy metals. Currently, the watershed is only about 2.6% urban. Limiting paved surfaces is the key to slowing urban nonpoint source pollution. The use of grass swales, open spaces, and storm water retention ponds are recommended to slow runoff in urban areas.

The watershed has an increasing population living in suburban areas. Residential landscapes are often designed with large turf areas which require high amounts of water and chemicals to maintain. The use of excessive amounts of fertilizers and lawn care chemicals in residential areas can contribute a significant amount of pollution to nearby water resources. Suburban nonpoint source pollution can be limited by: using less lawn fertilizers and chemicals; control of construction sites; proper disposal of pet waste; establishing large areas of native vegetation; and conserving the amount of water use for plant maintenance.

Lakes & Wetlands

Huc 8 10270101 is the home to Ogden City Lake and several other smaller city and county lakes. See Attachment 2 for a map of the lakes in HUC 8 10270101.

Designated Uses

According to the Surface Water Register, the Ogden City Lake is designated for expected aquatic life use and food procurement.

TMDL/Contaminate Concerns

Surface waters not meeting their designated uses will require total maximum daily loads. Currently, only one lake, the Ogden City Lake requires a TMDL. This lake's primary pollutant concern is eutrophication. Eutrophication is a natural process which creates conditions favorable for algae blooms and excess plant growth. This process is often accelerated by excess nutrient loading from the watershed.

Potential Pollution Sources

Based on the watershed's land use percentages, the primary pollutant sources for nutrients causing eutrophication and FCB may be grazingland. Additionally, feedlots, septic systems, row crop agriculture and urban/suburban runoff may contribute significant amounts of nutrients into the watershed.

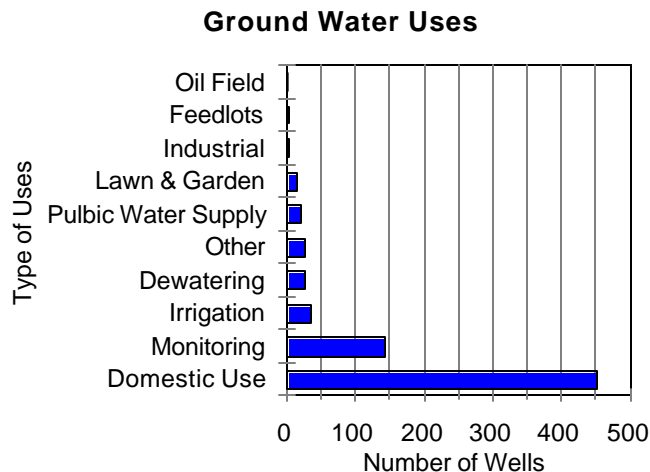
Groundwater

Major groundwater aquifers underlying this watershed include portions of the Glacial Drift and Alluvial aquifers of the Kansas River and its tributaries. See attachment 4 for a map of groundwater aquifers.

Designated Uses

There are approximately 721 groundwater wells located within the watershed. Water from these wells is used for domestic use, groundwater monitoring, irrigation, dewatering, public water supply, lawn and garden, industrial, feedlots, and oil field supply.

Figure 4



Aquifer Characteristics

Glacial Drift Aquifer: Portions of the Glacial Drift aquifer exist in the northeast portion of the watershed. Water from this aquifer is often used for rural domestic water supply. Historically, water from this aquifer is very hard with nitrates being one of the primary pollutant concerns.

Alluvial Aquifer: Alluvial aquifers of the Kansas River and its tributaries exist throughout the watershed. Alluvial aquifers provide the primary water source for many public water supplies located within the watershed. Water quality in alluvial aquifers is generally good; however nitrates, minerals, pesticides, and bacteria can be pollutant concerns.

Potential Pollution Types and Sources

Common groundwater pollutants include: nitrates, chloride, sulfates, ammonia, iron, manganese and voc's. Nitrate impaired groundwater is perhaps the most prevalent groundwater contamination problem in the State.

Nitrate: Nitrate is a naturally compound mineral and is an essential component of all living matter. However, high concentrations of nitrate in drinking water can cause adverse health effects including “blue baby” syndrome. Sources of nitrate include municipal waste water treatment plant discharges, runoff from livestock operations, leaching of fertilizer from urban and agricultural areas, and failing septic systems.

Chloride: Chloride is a naturally occurring mineral found in Kansas lakes, streams, and groundwater. In high concentrations, chloride can cause deterioration of domestic plumbing, water heaters, and municipal water works. The primary source of chloride impacted groundwater is intrusion of salt water from deeper formations, often due to improperly constructed water wells which allow confined aquifers to come into contact with each other.

Ammonia: Ammonia is a chemical which is toxic to fish and aquatic organisms. Sources of ammonia are livestock, septic tanks, fertilizer, municipal and industrial waste.

VOCs: Volatile Organic Compounds, also called purgeable organics, are components of fuels and solvents. They are ingredients in many household and industrial products. Sources of VOCs are leaking fuel storage tanks, trash dumps, and some agricultural pesticides.

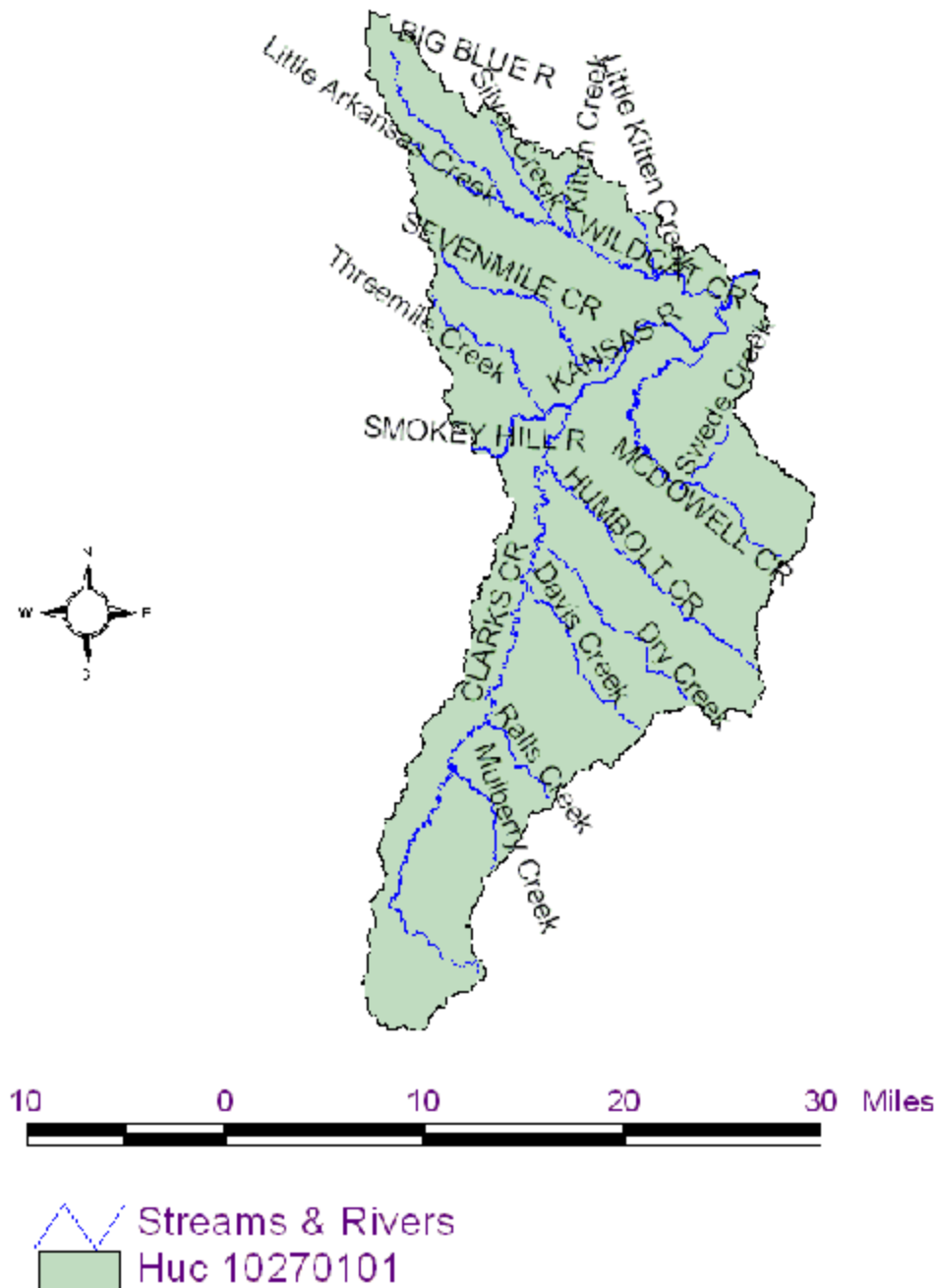
Iron: Iron is a naturally occurring element found in the soil throughout Kansas. It is an annoyance as it has an objectionable taste, causes a red stain to porcelain fixtures and laundry, and causes plumbing irritations.

Manganese: Manganese is a naturally occurring element and causes an unpleasant taste in drinking water, stains porcelain and laundry, and collects deposits in plumbing. It is naturally occurring throughout the soils in the state.

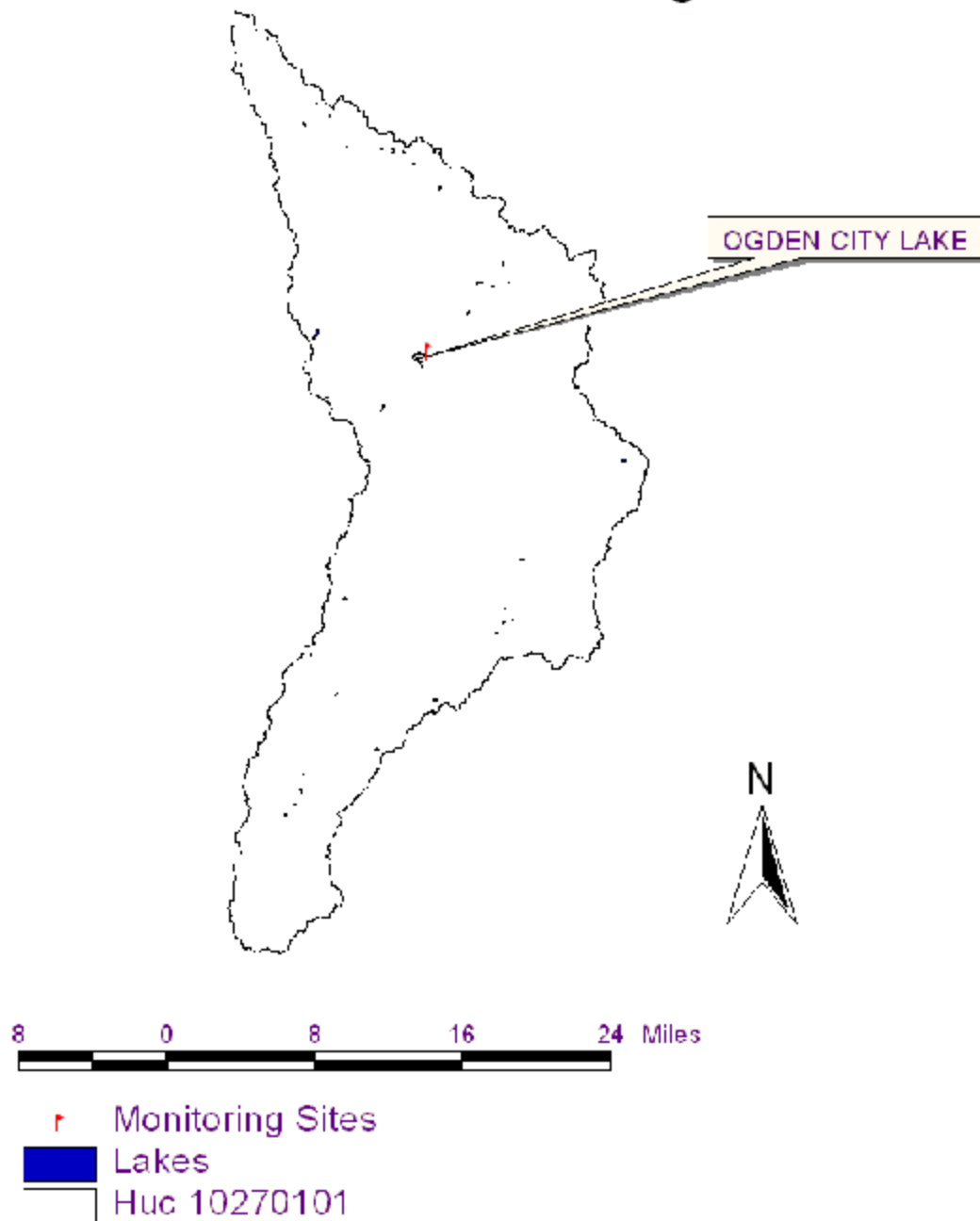
Attachment 1

Maps

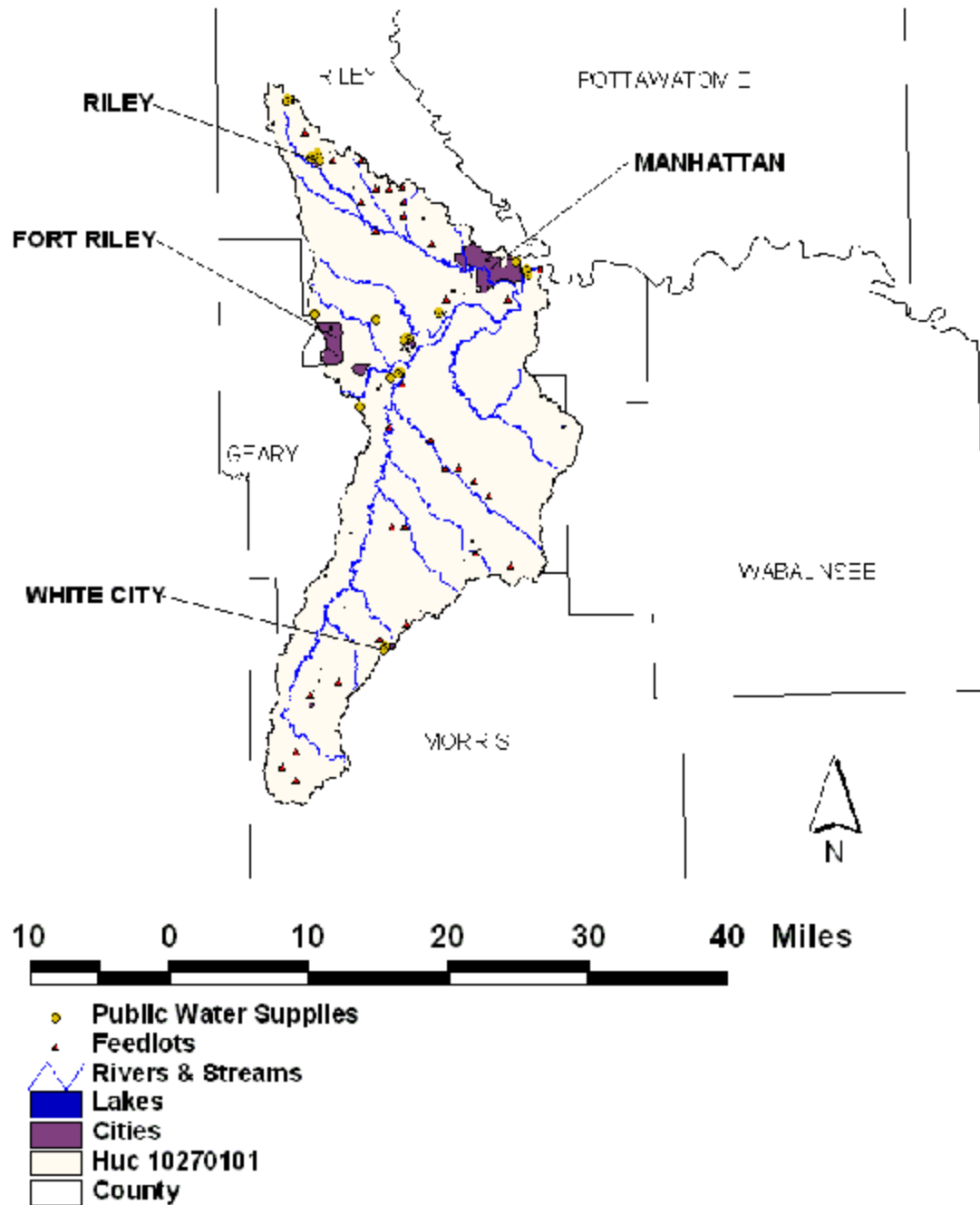
Huc -10270101- Upper Kansas Streams and Rivers



Huc -10270101- Upper Kansas Lake Monitoring Sites



Huc -10270101- Upper Kansas Watershed Boundary



Huc 8 10270101 Upper Kansas Groundwater Aquifers

